

We claim:

Claim 1. A wiring material comprising tungsten or a tungsten compound as a main component,

wherein the wiring material contains inert elements and argon is included in said inert elements at an amount of 90% or more, and

wherein an amount of sodium contained within the wiring material is 0.3 ppm or less.

Claim 2. A wiring material according to claim 1, wherein the tungsten compound is a compound of one element or a plurality of elements selected from the group consisting of Ta, Ti, Mo, Cr, Nb and Si, and tungsten.

Claim 3. A wiring material according to claim 1 or claim 2, wherein electrical resistivity of the wiring material is $40 \mu\Omega\bullet\text{cm}$ or less.

Claim 4. A semiconductor device having a wiring comprising:

a metallic film comprising one element or a plurality of elements, selected from the group consisting of W, Ta, Ti, Mo, Cr, Nb, and Si; a metallic compound film having said elements as main components; an alloy film of a combination of said elements; or a lamination film of thin films selected from the group consisting of said metallic film, said metallic compound film, and said alloy film,

wherein the wiring material contains inert elements and argon is included in said inert elements at an amount of 90% or more, and

wherein an amount of sodium contained within the wiring is 0.3 ppm or less.

Claim 5. A semiconductor device having a wiring comprising:

a film having tungsten or a tungsten compound as a main component,

wherein the wiring material contains inert elements and argon is included in said inert elements an at an amount of 90% or more, and

wherein an amount of sodium contained within the wiring material is 0.3 ppm or less.

Claim 6. A semiconductor device comprising:

a wiring having a lamination structure comprising a film having tungsten or a tungsten compound as a main component, and a nitride film of tungsten,

wherein the wiring material contains inert elements and argon is included in said inert elements an at an amount of 90% or more, and

wherein an amount of sodium contained within the wiring is 0.3 ppm or less.

Claim 7. A semiconductor device comprising:

a wiring having a lamination structure containing a silicon film having an added impurity element for imparting conductivity, a film having tungsten or a tungsten compound as a main component, and a nitride film of tungsten,

wherein the wiring material contains inert elements and argon is included in said inert elements an at an amount of 90% or more, and

wherein an amount of sodium contained within the wiring is 0.3 ppm or less.

Claim 8. A device according to any one of claims 4 to 7, wherein the wiring is formed by a sputtering method using argon as a sputtering gas.

Claim 9. A device according to any one of claims 4 to 8, wherein an inert element other than argon is contained within the wiring at an amount of 1 atoms% or less.

Claim 10. A device according to any one of claims 4 to 8, wherein an inert element other than argon is contained within the wiring at an amount of 0.1 atoms% or less.

Claim 11. A device according to claim 9 or 10, wherein an inert element other than the argon is Xe or Kr.

Claim 12. A device according to any one of claims 5 to 11, wherein internal stress of the film having tungsten or a tungsten compound as its main component is from

-1×10^{10} dyn/cm² to 1×10^{10} dyn/cm².

Claim 13. A device according to any one of claims 4 to 12, wherein line width of the wiring is 5 μm or less.

Claim 14. A device according to any one of claims 4 to 13, wherein film thickness of the

wiring is 0.1 μm or more, and 0.7 μm or less.

Claim 15. A device according to any one of claims 4 to 14, wherein the wiring is used as a gate wiring of a TFT.

Claim 16. A device according to any one of claims 4 to 15, wherein resistance value per 1 μm square of surface area of a connection between the wiring and an aluminum wiring is 40 Ω or less.

Claim 17. A device according to claims 4 to 16, wherein the semiconductor device is an active matrix type liquid crystal display, an active matrix type EL display, or an active matrix type EC display.

Claim 18. A device according to claims 4 to 17, wherein the semiconductor device is a video camera, a digital camera, a projector, a goggle type display, a car navigation system, a personal computer, or a portable information terminal.

Claim 19. A method of manufacturing a semiconductor device having at least a wiring on an insulating surface, wherein the wiring is formed by the steps of:

forming a tungsten film by a sputtering method; and
patterning the tungsten film.

Claim 20. A method according to claim 19, wherein the sputtering method uses a tungsten

target having a purity of 4N or more.

Claim 21. A method according to claim 19, wherein the sputtering method uses a tungsten alloy target having a purity of 4N or more.

Claim 22. A method according to any one of claims 19 to 21, wherein the sputtering method uses only argon as a sputtering gas.

Claim 23. A method according to any one of claims 19 to 22, wherein the sputtering method is performed at a substrate temperature of 300°C or lower.

Claim 24. A method according to any one of claims 19 to 23, wherein the sputtering method is performed at a gas pressure from 0.1 Pa to 3.0 Pa.

Claim 25. A method according to any one of claims 19 to 23, wherein the sputtering method is performed at a gas pressure from 1.0 Pa to 2.0 Pa.